

IN THE CLAIMS

1 *Sub* 1. ~~An amusement apparatus for water sports activities utilizing a stably-~~
2 shaped body of water having a surface thereon, comprising:

3 a). means for forming a substantially horizontal body of water,
4 said water having a substantially horizontal surface thereon;

5 b). the water of said horizontal body of water moving in a
6 predetermined direction over said horizontal forming means with a
7 first horizontal velocity:

8 (1) said horizontal body of water:

9 (a) having a shape and dimensions thereof
10 substantially stable with respect to time;

11 c). means for forming an upwardly inclined body of water, said
12 water having an upwardly inclined surface thereon;

13 d). means for joining said horizontal forming means to said
14 upwardly inclined forming means.

15 e). the water of said horizontal body of water moving over said
16 joining means and on to said upwardly inclined forming means to
17 form said upwardly inclined body of water;

18 f). the water of said upwardly inclined body of water moving
19 over said upwardly inclined forming means with a second velocity:

20 g). said upwardly inclined surface of said body of water having a
21 slope sufficient to permit an object floating by condition of motion
22 thereon to slide down said upwardly inclined surface with a third
23 velocity, relative to said second velocity, at least as great as the
24 negative of said second velocity.

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1 2. An apparatus as defined in claim 1 wherein said means for forming
2 said upwardly inclined body of water includes first and second interconnected inclined
3 surfaces, said first surface being connected to said means for forming said horizontal body
4 of water, said second surface being connected to said first surface to provide a continuous
5 flow of water over said horizontal, first and second surfaces, said second surface having
6 greater angular inclination with respect to said horizontal than said first surface.

1 3. An apparatus as defined in claim 2 wherein the angular inclination
2 of said second surface is sufficient to permit an object floating by condition of motion
3 thereon to slide down said second surface with a velocity greater than the negative of
4 said second velocity.

1 4. An apparatus as defined in claim 3 wherein the minimum length in
2 B the direction of flow of said horizontal flow forming means is equal to 1.5 to 4 times the
3 total vertical height of said means for forming said upwardly inclined body of water.

1 5. An apparatus as defined in claim 4 wherein said first inclined surface
2 has a length in the direction of flow which is at least equal to the length of a device
3 being employed by a user of said apparatus.

1 6. An apparatus as defined in claim 4 wherein said first inclined surface
2 is curved.

1 7. An apparatus as defined in claim 4 wherein said first inclined surface
2 is straight.

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1 8. An apparatus as defined in claim 6 wherein said body of water
2 conforms to said horizontal, first and second surfaces.

CLAIM 8

1 9. The apparatus as defined in claim 1 wherein said upwardly inclined
2 body of water and said horizontal body of water have sufficient depth to permit surfing
3 maneuvers thereon.

1 10. The apparatus as defined in claim 1 wherein said upwardly inclined
2 surface of water and said horizontal surface of water have sufficient width and length to
3 permit surfing maneuvers thereon.

1 ~~8/17~~ 11. ~~An amusement apparatus for water sports activities using a body of~~
2 ~~water flowing in a predetermined direction comprising:~~

- 3 a). means for forming an upwardly inclined body of water, said
4 water having an upwardly inclined surface thereon;
- 5 b). said forming means defining an elevated ridge line, said ridge
6 line having first and second sides, one of said first and second sides
7 having a greater elevation than the other of said first and second
8 sides;
- 9 c). the water of said upwardly inclined body of water moving over
10 said upwardly inclined forming means with a range of velocity and
11 volume to a pre-determined maximum;

12 (1) said inclined body of water

13 (a) having shape and dimension thereof proportional
14 to pre-determined velocity and volume ratios;

15 i) at a minimum, having a shape and
16 dimensions thereof that are substantially stable
17 with respect to time at said other side and having

18 a white water breaking region maintained
19 upstream of said one side;

20 ii) at a maximum, having a shape and
21 dimensions thereof from said other side to said
22 one side substantially stable with respect to time;

23 (b) having at a minimum, velocity and volume
24 sufficient to form, over a period of time, an inclined
25 body of water that at least flows over said other side;

26 (c) having at a maximum, velocity and volume
27 sufficient to form an inclined body of water that flows
28 over said other side and said one side.

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1 12. The apparatus as defined in Claim 11 further comprising:

2 a). means for forming a horizontal body of water with a horizontal
3 surface thereon;

4 b). the water of said horizontal body of water moving over said
5 horizontal forming means with a first horizontal velocity;

6 (1) said horizontal body of water:

7 (a) having a shape and dimensions thereof
8 substantially stable with respect to time;

9 c). means for joining said horizontal forming means to said
10 upwardly inclined forming means;

11 d). the water of said horizontal body of water moving over said

12 joining means and on to said upwardly inclined forming means to
13 form said upwardly inclined body of water with said upwardly inclined
14 surface thereon.

1 The apparatus as defined in Claim 12 further comprising:
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a). means for forming a downwardly inclined body of water with
a downwardly inclined surface thereon;

b). the water of said downwardly inclined body of water moving
over said downwardly inclined forming means with a first velocity;

(1) said downwardly inclined body of water;

(a) having a shape and dimensions thereof
substantially stable with respect to time;

c). means for joining said downwardly inclined forming means to
said horizontal forming means;

d). the water of said downwardly inclined body of water moving
over said joining means and on to said horizontal forming means to
form said horizontal body of water with said horizontal surface
thereon.

1 14. The apparatus as defined in Claim 11 wherein said upwardly inclined
2 body of water having sufficient depth to permit surfing maneuvers thereon, and wherein
3 said upwardly inclined surface of water having sufficient width and length to permit
4 surfing maneuvers thereon.

44 CLAIMS 15-16

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15. The apparatus as defined in Claim 12 wherein said upwardly inclined body of water and said horizontal body of water having sufficient depth to permit surfing maneuvers thereon, and wherein said upwardly inclined surface of water and said horizontal surface of water having sufficient width and length to permit surfing maneuvers thereon.

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~~16. The apparatus as defined in Claim 13 wherein said upwardly inclined body of water and said horizontal body of water having sufficient depth to permit surfing maneuvers thereon, and wherein said upwardly inclined surface of water and said horizontal surface of water having sufficient width and length to permit surfing maneuvers thereon.~~

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17. The apparatus as defined in ~~Claim~~ 11 wherein said upwardly inclined body of water having sufficient depth to permit water skimming maneuvers thereon, and wherein said upwardly inclined surface of water having sufficient width and length to permit water skimming maneuvers thereon.

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18. The apparatus as defined in ~~Claim~~ 12 wherein said upwardly inclined body of water and said horizontal body of water having sufficient depth to permit water skimming maneuvers thereon, and wherein said upwardly inclined surface of water and said horizontal surface of water having sufficient width and length to permit water skimming maneuvers thereon.

1 19. The apparatus as defined in Claim 13 wherein said upwardly inclined
2 body of water and said horizontal body of water and said downwardly inclined body of
3 water having sufficient depth to permit water skimming maneuvers thereon, and wherein
4 said upwardly inclined surface of water and said horizontal surface of water and said
5 downwardly inclined surface of water having sufficient width and length to permit water
6 skimming maneuvers thereon.

1 20. A stably-shaped body of water with a surface thereon, comprising:

2 a). first means having a downstream end for forming a
3 downwardly inclined body of water with a downwardly inclined surface
4 thereon;

5 b). the water of said downwardly inclined body of water moving
6 over said downwardly inclined forming means with a first velocity:

7 (1) said downwardly inclined body of water:

8 (a) having a shape and dimensions thereof
9 substantially stable with respect to time;

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11 c). second means having an upstream end for forming an upwardly
12 inclined body of water with an upwardly inclined surface thereon;

13 d). the water of said upwardly inclined body of water moving over
14 said upwardly inclined forming means with a first upwardly inclined
15 velocity:

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CLAIM 20

16 (1) said upwardly inclined body of water:

17 (a) having a shape and dimensions thereof
18 substantially stable with respect to time;

19 e). said upwardly inclined body of water having an upwardly
20 inclined surface:

21 (1) having a downstream slope sufficient to permit an object
22 floating by condition of motion thereon to slide down said slope with
23 a second upwardly inclined velocity, relative to said first upwardly
24 inclined velocity, at least as great as the negative of said first
25 upwardly inclined velocity; and

26 f). means interconnecting said first and second means at said
27 downstream and upstream ends respectively transitioning said body
28 of water from its downward inclination to its upward inclination.

1 21. The apparatus as defined in Claim 20 wherein said upwardly inclined
2 body of water having an upwardly inclined surface:

3 a). having an upstream slope insufficient to permit an object
4 floating by condition of motion thereon to slide down said slope; and

5 b). having a downstream slope sufficient to permit an object
6 floating by condition of motion thereon to slide down said slope with
7 a second upwardly inclined velocity, relative to said first upwardly
8 inclined velocity, at least as great as the negative of said first
9 upwardly inclined velocity; and

10 c). having a furthestmost downstream slope sufficient to permit an
11 object floating by condition of motion thereon to slide down said
12 slope with a second upwardly inclined velocity, relative to said first
13 upwardly inclined velocity, greater than the negative of said first
14 upwardly inclined velocity.

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1 22. The apparatus as defined in Claim 20 wherein said interconnecting
2 means includes a portion providing a horizontal body of water and said upwardly inclined
3 body of water and said horizontal body of water have sufficient depth to permit surfing
4 maneuvers thereon, and wherein said upwardly inclined surface of water and said
5 horizontal surface of water have sufficient width and length to permit surfing maneuvers
6 thereon.

1 23. The apparatus as defined in Claim 20 wherein said interconnecting
2 means include a portion providing a horizontal body of water and said upwardly inclined
3 body of water and said horizontal body of water and said downwardly inclined body of
4 water have sufficient depth to permit water skimming maneuvers thereon, and wherein
5 said upwardly inclined surface of water and said horizontal surface of water and said
6 downwardly inclined surface of water have sufficient width and length to permit water
7 skimming maneuvers thereon.

of an inclined surface allows spilling type wave formations as well as facilitating the removal of a transient surge. A novel fluid "half-pipe" waveform is also introduced.

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1 24. An amusement apparatus for water sports activities using a body of
2 shallow water flowing in a predetermined direction comprised of:

3 a). means for forming an upwardly inclined body of water, said
4 water having an upwardly inclined surface thereon;

5 b). said forming means having an area of shaped face having
6 width and length and a tunnel wave forming area;

7 (1) said tunnel waving forming area;

8 (a) having predominantly concave curvature in
9 sections both parallel and normal to the horizontal;

10 (b) facing, as a whole, in a direction angularly
11 displaced with respect to the direction of water flow of
12 said upwardly inclined body of water and having;

13 i) an inclination with respect to the
14 horizontal; and

15 ii) an attitude with respect to the direction
16 of water flow;

17 (c) facing predominantly, at any given point, in a
18 direction predominantly tangential to the direction of
19 water of said upwardly inclined body of water whereby
20 said body of water conforms to said concave curvature;

21 (d) having a down stream terminus such that the
22 angle of release for the body of water defines an acute
23 angle with respect to the horizontal;

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24 (e) attitude being greater than ninety degrees and
25 less than parallel with respect to said direction
26 of water flow; and

27 c). a source of water for providing said body of shallow water;
28 said body of water having:

- 29 (1) a depth sufficient only to allow skimming maneuvers;
30 (2) a velocity which is at least super critical; and
31 (3) a momentum transfer sufficient to support a user on
32 said surface while performing water skimming
33 maneuvers.

1 25. An amusement apparatus for water sports activities using a body of
2 water flowing in a predetermined direction comprised of:

- 3 a). means for forming an upwardly inclined body of water, said
4 water having an upwardly inclined surface thereon;
5 b). said forming means having an area of shaped face having
6 width and length and a tunnel wave forming area;
7 (1) said tunnel waving forming area;
8 (a) having predominantly concave curvature in
9 sections both parallel and normal to the horizontal;
10 (b) facing, as a whole, in a direction angularly
11 displaced with respect to the direction of water flow of
12 said upwardly inclined body of water and having;

13 i) an inclination with respect to the
14 horizontal; and

15 ii) an attitude with respect to the direction
16 of water flow;

17 (c) facing predominantly, at any given point, in a
18 direction predominantly tangential to the direction of
19 water of said upwardly inclined body of water whereby
20 said body of water conforms to said concave curvature;

21 (d) having a down stream terminus such that the
22 angle of release for the body of water defines an acute
23 angle with respect to the horizontal;

24 (e) attitude being greater than ninety degrees and
25 less than parallel with respect to said direction of water
26 flow;

27 (2) said inclined surface forming area including:

28 (a) from an upstream boundary, concave curvature
29 in horizontal towards an upward incline;

30 (b) between said upstream and a downstream
31 boundary, an upward incline;

32 (c) towards said downstream trailing boundary,
33 convex curvature in sections normal to the horizontal
34 and from an upward incline towards the horizontal;

35 (d) said downstream boundary being at an angle from

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the horizontal;

i) said downstream boundary having an elevated side and a non-elevated side;

(1) said elevated side continuous with said downstream boundary of said tunnel wave forming area;

(e) facing, as a whole, in a direction obtuse to the direction of water of said upwardly inclined body of water and having;

i) an inclination with respect to the horizontal; and

ii) an attitude with respect to the flow direction;

(f) facing predominantly, at any given point, in a direction tangential to the direction of water of said upwardly inclined body of water;

c). a source of water for providing said body of water, said water of said upwardly inclined body of water moving over said forming means with a range of velocity and volume to a pre-determined maximum;

(1) said upwardly inclined body of water:

(a) having shape and dimension thereof proportional to pre-determined velocity and volume ratios;

59 i) at a minimum, having a shape and
60 dimensions thereof that are substantially stable
61 with respect to time at said non-elevated side and
62 having white water breaking region maintained
63 upstream and of said elevated side;

64 ii) at a maximum, having a shape and
65 dimensions thereof from said non-elevated side
66 to said elevated side substantially stable with
67 respect to time;

68 (2) said water of said inclined body of water:

69 (a) having a minimum, velocity and volume sufficient
70 to form, over a period of time, an inclined body of
71 water that at least flows over said non-elevated side;

72 (b) having a maximum, velocity and volume sufficient
73 to form an inclined body of water that flows over said
74 non-elevated side.

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1 26. A method of increasing speed during use of an amusement water ride
2 comprising:

3 P_1 providing a continuous flow of water having an equilibrium area sandwiched
4 between a sub-equidyne area and a supra-equidyne area with flow being from said sub-^(c)
5 equidyne area to said supra-equidyne area;

6 P_1 positioning said sub-equidyne area as the lowest area of said flow of water;
7 and

8 P_1 proportioning said sub-equidyne area, said supra-equidyne area and said
9 equilibrium area so that a rider on said water flow may oscillate between a position on
10 said supra-equidyne area through said equilibrium area to said sub-equidyne area and
11 by extending himself accelerates and may return toward said supra-equidyne area at an
12 increased speed.

1 27. The apparatus as defined in claim 1 wherein said upwardly inclined
2 body of water and said horizontal body of water have sufficient depth to permit surfing
3 and water skimming maneuvers thereon.

1 28. The apparatus as defined in claim 1 wherein said upwardly inclined
2 surface of water and said horizontal surface of water have sufficient width and length to
3 permit surfing and water skimming maneuvers thereon.